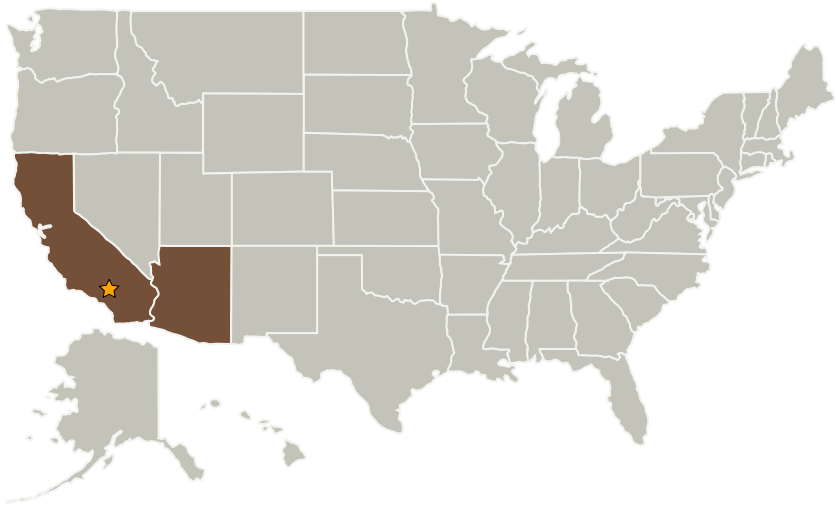
GVT-Based Ground Flutter Test without Wind Tunnel, Phase I

Completed Technology Project (2008 - 2009)

Project Introduction

ZONA Technology, Inc (ZONA) and Arizona State University (ASU) propose a R&D effort to develop a ground flutter testing system without wind tunnel, called the Dry Wind Tunnel (DWT) system. The DWT system consists of a ground vibration test (GVT) hardware system and a real-time unsteady aerodynamic force generation software developed from an aerodynamic reduced order model (ROM). The ground flutter test using the DWT system operates on the real structural model, thereby no scale-down structural model is involved. Furthermore, the impact of the structural nonlinearities on the aeroelastic stability can be automatically included. Moreover, the aeroservoelastic characteristics of the aircraft can be easily measured by simply including the flight control system in the loop. In addition, the unsteady aerodynamics generated computationally is interference-free from the wind tunnel walls. Finally, the DWT can be conveniently and inexpensively carried out as a post GVT test with the same hardware. In Phase I, we will validate this DWT concept on a rectangular flat plate with a reference flutter solution. Through this validation process, the most significant hardware issues will be resolved to pave the way for a successful Phase II validation on a complex structure, such as a real aircraft.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Armstrong Flight Research Center (AFRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Armstrong Flight Research Center(AFRC)	Lead Organization	NASA Center	Edwards, California
ZONA Technology, Inc.	Supporting Organization	Industry Small Disadvantaged Business (SDB)	Scottsdale, Arizona

Primary U.S. Work Locations	
Arizona	California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Evan Lally

Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.3 Aeroelasticity